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L17: Entry 10 of 10

File: USPT

Jan 20, 1998

DOCUMENT-IDENTIFIER: US 5709983 A

TITLE: Nonaqueous solid particle dye dispersions

Brief Summary Text (8):

Another proposed method comprises providing a dyed or pigmented layer behind a clear support as an antihalation backing layer, wherein the backing layer is designed to be removed during processing of the film, as disclosed in, e.g., U.S. Pat. No. 4,914,011. Typical examples of such antihalation backing layers comprise a dye or pigment (such as carbon black) which functions to absorb the light dispersed in an alkali-soluble polymeric binder (such as cellulose acetate hexahydrophthalate) that renders the layer removable by an alkaline photographic processing solution. Such backing layers have been commonly used for antihalation protection in motion picture films. Such backing layers provide effective antihalation protection during exposure, however, their use requires special additional processing steps for their subsequent removal, and incomplete removal of the pigmented antihalation layer can cause image defects in the resulting print film. Additionally, such removable layers fail to provide any scratch and abrasion resistance, lubricity and antistatic protection for the processed element after their removal.

Brief Summary Text (11):

While the incorporation of filter dyes as solid particle dispersions may help alleviate problems to a certain extent, the presence of solid particle dyes in sufficient quantities may also cause layer adhesion problems to the support. Another problem associated with solid particle dispersions of filter dyes which are relatively insoluble at aqueous coating pH's of less than 7 and readily soluble and/or decolorizable at alkali processing pH's of above 8, is their hydrophobicity at low pH coupled with the presence of ionogenic groups such as carboxyl, hydroxyl, etc., often makes it difficult to obtain stable, finely divided, solid particle dispersions of these dyes in water at high concentrations using conventional surfactants as dispersing agents. The viscosities of such dispersions tend to rise with decreasing particle size due to interparticle interaction which causes flocculation, and it has been found that the protection of conventional surfactants and polymers against such flocculation in an aqueous medium is often insufficient for obtaining stable aqueous solid particle dispersions of these dyes in concentrations higher than about 5 weight percent.

Brief Summary Text (13):

The use of water soluble filter dyes in a backing layer solves several problems related with the use of dyes or pigments (such as carbon black) in an alkali soluble, process removable binder as discussed above, as antihalation and filter layers having alkali soluble binders have the disadvantage of creating dust that can smear the photographic elements, and they are cumbersome to remove before development of the film. However, coating a layer on the backside of a photographic element often requires the use of an organic solvent due to various constraints. These may include coating on or over water-sensitive layers or supports, coating at high speeds with limited drying capabilities, coating of water insoluble film forming binders, and coating where the presence of substantial amounts of water

will impede efficient recovery of organic solvents used elsewhere in the manufacturing process.

Brief Summary Text (21):

The present invention provides a method to incorporate filter dyes with the desired absorbance characteristics for imaging elements, in coating processes that cannot tolerate significant quantities of water. Filter dyes previously disclosed for use in the form of solid particle dispersions typically have low solubility in water and organic solvents due to their highly crystalline nature, and therefore cannot be dissolved at sufficiently high concentrations in organic liquids to provide adequate antihalation protection. The filter dyes are decolorized or removed upon processing, and may be incorporated on the back of a photographic film support with a binder and a lubricant, either in the same layer or separate layer, over a protected antistatic layer. Pre-processing physical properties of antihalation protection, abrasion resistance, lubricity and antistatic properties can be obtained which are equal to or superior to the prior art of removable backing layers containing carbon, while the properties of abrasion resistance, lubricity and antistatic protection are also advantageously retained after processing, unlike films that contain carbon on the back of the support. This is especially desirable for motion picture film materials, which are subject to continued rapid transport processes even after photographic processing. This invention also has the advantage that fine particle, nonaqueous dispersions can be prepared with dyes at relatively high concentrations without adverse effects on the rheology of the dispersion and colloidal stability.

Detailed Description Text (15):

In a preferred embodiment of the invention, a dispersant is present in the solid particle dispersions, preferably in the range of 1 to about 100%, more preferably about 5 to 75%, the percentage being by weight, based on the weight of the dye. The dispersant can be nonionic, such as: fatty alcohols, fatty acids, fatty esters, glycerol esters, diols, polyethoxylated diols, alkyl phenols, acetylinic glycols, alkanolamines and alkanolamides, polyethoxylated mercaptans, sorbitol and sorbitan derivatives, and nonionic block, graft, and comb copolymers; cationic, such as: polyester/polyamine copolymers, alkylamines, quaternary amines, imidazolines, dialkylamine oxides, polyester amines; anionic, such as salts of fatty acids, salts of multiple acids, sarcosine derivatives, salts of tall oil acids, sodium alkyl sulfonates, alpha-olefin sulfonates, alkylbenzene sulfonates, aromatic sulfonates, isothionates, sulfosuccinates, taurates, alcohol sulfates, alkyl phenol sulfates, sulfated triglycerides, alcohol phosphates; zwitterionic, such as: amino acids, imino acids, betaines, imidazolines, phospholipids; polymers such as: polyvinylpyrrolidones, polysaccharides, lignin derivatives, protein-based surfactants, polyacrylates, condensed naphthalene sulfonates, ethylene/acrylic acid copolymers, polesters, vinylbenzyl/methacrylate copolymers, polyethoxy/polypropoxy alcohol copolymers, and acrylic acid/isocyanate copolymers, as shown in the book *Dispersing Powders in Liquids* by R. D. Nelson, pp. 88-105, 1988, and the book entitled *Dispersions of Powders in Liquids* by G. D. Parfitt, Ed., pp. 177-191, 1986, incorporated herein by reference. Suitable materials useful in accordance with this invention are also described in U.S. Pat. No. 4,861,380 to Campell et al., U.S. Pat. No. 4,042,413 to Hauxwell et al., U.S. Pat. No. 4,156,616 to Dietz et al., and U.S. Pat. No. 4,019,923 to Mahe, incorporated herein by reference. Preferred materials include polyester amines sold by Zeneca, Inc. under the trade name designations Solsperse 24000 and Solsperse 20000 and by ICI Americas, Inc. under the trade name designations Hypermer LP4, Hypermer PS2 and Hypermer PS3; polyethylene oxide-polypropylene oxide block copolymers sold by BASF, Inc. under the trade name Pluronic, Pluronic.RTM., Tetronic and Tetronic.RTM.; ethoxylated dialcohols sold by Air Products and Chemicals, Inc. under the trade names Surfynol 104, Surfynol 420, 440, 465, 485, 504, SE, SEF, DF-110, DF-210, DF-110L, DF-120, CT111, CT121, CT131, CT136, and CT324; and polyvinylpyrrolidones. It is understood that this list is representative only, and not meant to be exclusive.

Detailed Description Text (16):

The resulting non-aqueous solid particle dispersions can be added to an organic solvent based coating composition containing a binder, for use in the preparation of a backing layer of a film support. The organic solvent may be selected, e.g., from the above referenced non-aqueous liquids.

Detailed Description Text (17):

The binder may consist of any organic solvent-soluble material which forms a substantially aqueous photographic processing solution insoluble film. The film forming binders are preferably water insoluble vinyl co-polymers derived from any copolymerizable monomers, such as .alpha.,.beta.-ethylenically unsaturated monomer (including two, three, or more repeating units) such as ethylene, propylene, 1-butene, isobutene, 2-methylpentene, 2-methylbutene, 1,1,4,4-tetramethylbutadiene, styrene, .alpha.-methylstyrene; monoethylenically unsaturated esters of aliphatic acids such as vinyl acetate, isopropenyl acetate, allyl acetate, etc.; esters of ethyleneically unsaturated mono- or dicarboxylic acids such as methyl methacrylate, ethyl acrylate, diethyl methylenemalonate, etc.; monoethylenically unsaturated compounds such as acrylonitrile, allyl cyanide, and dienes such as butadiene and isoprene. The particular monomer units and their proportions may be selected to achieve a desired glass transition temperature for the resulting polymer as is well known in the art. For effective abrasion resistance, the film forming polymer binders preferably have a glass transition temperature of about 20.degree. C. or higher, more preferably about 40.degree. C. or higher.

Detailed Description Text (18):

The organic solvent soluble polymeric film forming binders may also comprise a percentage of hydrophilic monomers (such as acrylic acids and acrylamides) to allow swelling of the backing layer to facilitate bleaching of the filter dyes, to the extent such hydrophilic monomers do not cause such binders to become readily soluble in alkaline processing solutions. The percentages of hydrophobic and relatively hydrophilic monomers may be selected by the artisan to obtain the desired degree of hardness and aqueous swellability, as long as the film remains photographic process surviving. It is an unexpected advantage of the invention, however, that nonaqueous solid particle dye dispersions were found to be readily removed or decolorized upon photographic processing even from coatings formed from essentially completely hydrophobic polymeric binders such as poly(methyl methacrylate). In one preferred embodiment of the invention, the backing layer film is a relatively hard, abrasion-resistant film, which properties are enhanced by the use of relatively hydrophobic binders.

Detailed Description Text (19):

Organic solvent soluble film forming binders which may be used in combination with the solid particle dye dispersion of the invention include, for example, vinyl chloride-vinyl acetate copolymers, vinyl chloride-vinyl acetate-vinyl alcohol copolymers, vinyl chloride-vinyl acetate-maleic acid polymers, vinyl chloride-vinylidene chloride copolymers, vinyl chloride-acrylonitrile copolymers, acrylic ester-acrylonitrile copolymers, acrylic ester-vinylidene chloride copolymers, methacrylic ester-vinylidene chloride copolymers, methacrylic ester-styrene copolymers, methacrylate homopolymers and copolymers, thermoplastic polyurethane resins, phenoxy resins, polyvinyl fluoride, vinylidene, chloride-acrylonitrile copolymers, butadiene-acrylonitrile copolymers, acrylonitrile-butadiene-acrylic acid copolymers, acrylonitrile-butadiene-methacrylic acid copolymers, polyvinyl butyral, polyvinyl acetal, cellulose derivatives such as cellulose nitrate, cellulose acetate, cellulose diacetate, cellulose triacetate, cellulose acetate butyrate, and cellulose acetate propionate, styrene-butadiene copolymers, polyester resins, phenolic resins, epoxy resins, thermosetting polyurethane resins, urea resins, melamine resins, alkyl resins, urea-formaldehyde resins and the like.

Detailed Description Text (20):

Acrylic ester homopolymers and copolymers are preferred binders in accordance with

this invention. Preferred binders include, e.g., polymers composed of 40-100 weight percent of an acrylic ester such as ethyl acrylate, methyl acrylate, propyl acrylate, ethyl methacrylate, propyl methacrylate, or butyl methacrylate, 0-30 weight percent of an acid such as acrylic acid, methacrylic acid, or itaconic acid, and 0-30 weight percent of an acrylamide such as N,N-dimethyl acrylamide, i-propyl acrylamide, t-butyl acrylamide, i-propyl methacrylamide, or t-butyl methacrylamide. Particularly preferred binders include methacrylate homopolymers, and polymers of about 50 weight percent ethyl acrylate, 25 weight percent acrylic acid, and 25 weight percent N,N-dimethyl acrylamide.

Detailed Description Text (26):

It is specifically contemplated that the film formats, materials and processes described in an article titled "Typical and Preferred Color Paper, Color Negative, and Color Reversal Photographic Elements and Processing," published in Research Disclosure, February 1995, Volume 370, the disclosure of which is incorporated herein by reference, may also be advantageously used with the non-aqueous solid particle filter dye dispersion containing backing layers of the invention.

Detailed Description Text (27):

In a preferred embodiment of the invention, the photographic elements contain one or more conducting or antistatic layers such as, e.g., layers described in Research Disclosure, Vol. 176, December 1978, Item 17643 to prevent undesirable static discharges during manufacture, exposure and processing of the photographic element. Antistatic materials conventionally used in color photographic films have been found to be satisfactory for use herewith. Such materials include, e.g., anionic and cationic polymers, electronic conducting non-ionic polymers, electrically-conductive metal-containing particles such as metal halides or metal oxides in polymer binders. Any of the antistatic agents set forth in U.S. Pat. No. 5,147,768, e.g., the disclosure of which is incorporated herein by reference, may be employed.

Detailed Description Text (28):

Exemplary antistatic materials which may be used include, e.g., anionic, cationic, or electronic conducting non-ionic polymers, and metal halides or metal oxides in polymer binders. Conductive fine particles of crystalline metal oxides dispersed with a polymeric binder have been used to prepare optically transparent, humidity insensitive, antistatic layers for various imaging applications. Many different metal oxides, such as  $\text{AnO}$ ,  $\text{TiO}_{2.2}$ ,  $\text{ZrO}_{2.2}$ ,  $\text{Al}_{2.3}\text{O}_3$ ,  $\text{SiO}_{2.2}$ ,  $\text{MgO}$ ,  $\text{BaO}$ ,  $\text{MoO}_{3.3}$ , and  $\text{V}_{2.5}\text{O}_5$ , are disclosed as useful as antistatic agents in photographic elements or as conductive agents in electrostatographic elements in such patents as U.S. Pat. Nos. 4,275,103; 4,394,441; 4,416,963; 4,418,141; 4,431,764; 4,495,276; 4,571,361; 4,999,276; and 5,122,445, the disclosures of which are hereby incorporated by reference. Preferred metal oxides include antimony doped tin oxide, aluminum doped zinc oxide, and niobium doped titanium oxide, as these oxides have been found to provide acceptable performance characteristics in demanding environments. Particular preferred metal oxides for use in this invention are antimony-doped tin oxide, zinc antimonates, and vanadium pentoxide which provide good resistance to static discharge. Preferred polymeric antistats include polyanilines. In accordance with an advantage of the invention, the antistatic materials may be included in the permanent non-aqueous coated solid particle filter dye dispersion containing layer, or in a separate permanent layer, on the backside of the photographic element support to provide post-processing as well as pre-processing antistatic protection.

Detailed Description Text (29):

To provide protection of the antistatic layer, a protective overcoat or barrier layer may be applied thereon. The protective layer can chemically isolate the antistatic layer and also serve to provide additional scratch and abrasion resistance. The protective overcoat layers may be the same layer as the nonaqueous solid particle filter dye dispersion containing layer, or may be a separate layer,

and may comprise, e.g., cellulose esters, cellulose nitrate, polyesters, acrylic and methacrylic copolymers and homopolymers, polycarbonates, polyvinyl formal polymethyl methacrylate, polysilicic acid, polyvinyl alcohol, and polyurethanes. The chemical resistance of the antistatic layer or an overcoat can be improved by incorporating a polymer cross-linking agent into the antistatic layer for those overcoats that have functionally cross-linkable groups. Cross-linking agents such as aziridines, carbodiimide, epoxys, and the like are suitable for this purpose.

Detailed Description Text (30):

Matting agents may also be included in the antistatic layer or overcoat thereon in order to improve transport properties of the elements of the invention on manufacturing, printing, processing, and projecting equipment. Such matting agents can also help prevent sticking between the front and back sides of the elements in a tightly wound roll. Matting agents may be silica, calcium carbonate, other mineral oxides, glass speres, ground polymers and high melting point waxes, and polymeric matte beads.

Detailed Description Text (31):

The photographic elements according to this invention can be provided with a lubricating layer, such as a wax layer, on, over, or within the same layer as the filter dye dispersion. Suitable lubricants include silicone oil, silicones having polar groups, fatty-acid modified silicones, fluorine-containing silicones, fluorine-containing alcohols, fluorine-containing esters, polyolefins, polyglycols, alkyl phosphates and alkali metal salts thereof, alkyl sulfates and alkali metal salts thereof, polyphenyl ethers, fluorine-containing alkyl sulfates and alkali metal salts thereof, long chain (e.g., greater than C.sub.17) fatty amides such as stearamide, monobasic fatty acids having 10 to 24 carbon atoms (which may contain unsaturated bonds or may be branched) and metal salts thereof (such as Li, Na, K and Cu), monovalent, divalent, trivalent, tetravalent, pentavalent and hexavalent alcohols having 12 to 22 carbon atoms (which may contain unsaturated bonds or may be branched), fatty acid esters of monoalkyl ethers of alkylene oxide polymers, fatty acid amines having 8 to 22 carbon atoms and aliphatic amines having 8 to 22 carbon atoms. Specific examples of these compounds (i.e., alcohols, acids or esters) include lauric acid, myristic acid, palmitic acid, stearic acid, behenic acid, docosanoic acid, butyl stearate, oleic acid, linolic acid, linolenic acid, elaidic acid, octyl stearate, amyl stearate, isoctyl stearate, sodium stearate, sodium hexadecyl sulfate, octyl myristate, butoxyethyl stearate, anhydrosorbitan monostearate, anhydrosorbitan distearate, pentaerythrityl tetrastearate, batyl alcohol, oleyl alcohol and lauryl alcohol. Carnauba wax dispersed in an organic liquid such as a low molecular weight alcohol is preferred. Such dispersions are commercially available from the Daniel Products Company as SLIP-AYD SL508.

Detailed Description Text (41):

In this example, a nonaqueous solid particle dye dispersion of dye D-13 was used to prepare a backing layer of a photographic support containing the dye dispersion for antihalation protection, a lubricant, an antistat, and an abrasion resistant binder.

Detailed Description Text (43):

A coating melt was prepared which contained filter dye from Dispersion C, a polymeric binder of ethyl acrylate, acrylic acid and N,N-dimethyl acrylamide in a weight ratio of 2:1:1, as a 25% solids solution in a 1:1 mixture of methanol and acetone, and carnauba wax in the form of a 17.5% solids dispersion of type 1 carnauba wax in isopropanol, supplied by the Daniel Products Company as SLIP-AYD SL508. The final melt concentration was 3% solids, 95.06% methanol and 1.94% acetone. The dye dispersion, binder solution and wax dispersion were combined such that the percentages of the dye, binder and wax relative to the total weight of solids were 40%, 54% and 6%, respectively. The coating melt was applied from a fixed-slot hopper having a gap width of 0.127 mm onto a cellulose triacetate support previously coated with an antistat layer comprising cellulose nitrate

binder and vanadium pentoxide at a weight ratio of 2:1 and a dry coverage 32 mg/m.sup.2, and a barrier layer comprising cellulose diacetate and cellulose nitrate at a weight ratio of 3:1 and a dry coverage of 215 mg/m.sup.2. The coating diagram is shown below. In the manufacture of a photosensitive photographic element, the opposite side of the support may be coated conventionally with a subbing layer and aqueous coated photosensitive silver halide emulsion layers.

Detailed Description Text (44):

A filter dye backing layer coating was prepared from the above described coating formulation. The coating was tested for coefficient of friction (ASTM Method # D1894, using an IMASS Instruments of Massachusetts flat bed tester and a carbide ball supported sled, at 21.degree. C., 50% RH, and a test speed of 198 cm/min for 35 mm by 5 cm test strips), scratch resistance (ASTM Single Arm Scratch test) and orthochromatic optical density. The coating was also processed in a commercially available motion picture photographic color print process which included processing in an alkaline aqueous solution at pH of above 8, to determine the amount of dye removed or decolorized after photographic processing. The color print process was the Eastman Color Print ECP-2B development process, commercially available from Eastman Kodak Co., USA. The ECP-2B process is described in, e.g., "Manual for Processing Eastman Color Film--H-24", available from Eastman Kodak Company, Rochester, N.Y.

Detailed Description Text (57):

A cellulose triacetate support was coated on one side thereof with an antistat layer comprising a 3:1:1 weight ratio of zinc antimonate, cellulose diacetate and ultraviolet light absorbing compound UVINUL 3050 at a dry coverage of 323 mg/m.sup.2 from a solution containing equal amounts of acetone and methanol. The antistat layer was then overcoated with a layer comprising filter dye D-1 from the dispersion in Example 1, filter dye D-7 from the methanol dispersion of Example 5, a polymeric binder of ethyl acrylate, acrylic acid and N,N-dimethyl acrylamide in a weight ratio of 2:1:1, carnauba wax in the form of a 17.5% solids dispersion in isopropanol, and acetone and methanol to form the balance of liquid in the melt. The final melt contained 3% solids, 38.8% acetone and 58.2% methanol. The dye dispersions, binder and wax were combined such that the weight ration of the dye D-1, the dye D-7, binder and wax was 3:3:3:1 respectively. The coating melt was applied over the antistat layer from a fixed-slot hopper having a gap width of 0.127 mm. The resulting dry coverages of dye D-1, dye D-7, binder and wax were 192 mg/m.sup.2, 192 mg/m.sup.2, 192 mg/m.sup.2 and 64 mg/m.sup.2 respectively.

CLAIMS:

2. The process of claim 1, wherein the film forming binder comprises a polymer comprising 40-100 weight percent of ethyl acrylate, methyl acrylate, propyl acrylate, ethyl methacrylate, propyl methacrylate, or butyl methacrylate units, 0-30 weight percent of acrylic acid, methacrylic acid, or itaconic acid units, and 0-30 weight percent of N,N-dimethyl acrylamide, i-propyl acrylamide, t-butyl acrylamide, i-propyl methacrylamide, or t-butyl methacrylamide units.

3. The process of claim 2, wherein the film forming binder comprises a polymer comprising about 50 weight percent ethyl acrylate units, about 25 weight percent acrylic acid units, and about 25 weight percent N,N-dimethyl acrylamide units.

22. The element of claim 17, wherein the film forming binder comprises a polymer comprising 40-100 weight percent of ethyl acrylate, methyl acrylate, propyl acrylate, ethyl methacrylate, propyl methacrylate, or butyl methacrylate units, 0-30 weight percent of acrylic acid, methacrylic acid, or itaconic acid units, and 0-30 weight percent of N,N-dimethyl acrylamide, i-propyl acrylamide, t-butyl acrylamide, i-propyl methacrylamide, or t-butyl methacrylamide units.

23. The element of claim 22, wherein the film forming binder comprises a polymer

comprising about 50 weight percent ethyl acrylate units, about 25 weight percent acrylic acid units, and about 25 weight percent N,N-dimethyl acrylamide units.

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May 13, 1986

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TITLE: Method for forming a sealed container

Brief Summary Text (16):

The present invention comprises a composite liner material comprising a deformable resilient layer, e.g. pulpboard coated with a layer of a readily releasable bonding material, e.g. a wax, contacting a foil layer which foil layer is adhesively bonded to a layer of strong tough thermoplastic or cellulosic material coated with a heat sealable layer, e.g., a polyolefin. This laminate material is capable of being embossed by a male die being pressed against the sealing layer and, with a suitable support opposite the backing material, an image may be imparted into the foil layer corresponding to that of the image on the male die.

Detailed Description Text (6):

FIG. 2 illustrates an example of a suitable closure liner 35 such as is available from Minnesota Mining and Manufacturing Company, St. Paul, Minnesota and identified as 75M comprises a backing layer 36 of deformable resilient material such as pulpboard having a thickness of 35 mils. The backing 36 has a coating of readily releasable bonding material 37 coated thereon. The material 37 is preferably a wax which is coated on the backing 36 and absorbed by the backing but it releasably bonds the backing onto the next layer, a layer of ductile embossable vapor impermeable material 38 such as a metal foil, preferably dead soft aluminum. The foil layer 38 is engaged with the wax layer 37 and has a desired thickness of 1 mil. The foil layer 38 is adhesively bonded by a layer of adhesive 39 to a tough thermoplastic film material 40 such as polyethylene terephthalate having a thickness of 0.5 mil. The adhesive 39 for bonding the polyethylene terephthalate (polyester) film to the foil layer 38 is preferably a polyurethane or an adhesive from the nitrile or vinyl family. Laminated to the film layer 40 is a sealing layer 41 having a desired thickness of 1.5 mils. An example of the sealing layer may be polyethylene.

Detailed Description Text (11):

The bottom of the die 62 with the raised indicia 63 is illustrated in FIG. 6, and the insert 30 in the embossing station 25 has the die 62 forced thereagainst, causing the sealing layer 41 to be recessed as at 65 which in turn forces the tough layer 40 against the foil layer 38 with sufficient force to drive the foil layer 38 into the wax coating 37 and into the pulpboard 36 in the selected areas to define in the foil layer an embossed image corresponding to that on the die 62. The differential pressure at the edges of the projecting die member 63 deform the ductile edges of the foil layer 38 to define the image therein. This is illustrated diagrammatically in FIG. 7. Further, the die 62 could be formed with a projecting edge adjacent its outer periphery to act as a cutting die to cut the sealing layer 41 and at least part of the thermoplastic layer 40 to weaken these layers within the sealing edge of the liner to make the barrier sealed to the container more easily rupturable by the customer.

Detailed Description Text (14):

After the closure liner 30 has been sealed to the container 66 and is secured in the cap 15 the container remains well sealed for shipment and storage. When it is



desired to remove the cap from the container the cap is separated by rotation of the cap relative to the container when the cap and container are internally threaded as illustrated in FIG. 8. Separation of the cap from the container causes a parting of the laminate between the wax coating and the foil layer 38. During the relative rotation to afford separation of the cap, as seen in FIG. 9, the wax 37, since it has been absorbed into the backing 36, releases the indicia, in the bas-relief areas 72 (see FIG. 10) defining the design or logo, and the foil layer 38 from the backing 36.

Detailed Description Text (15):

While the present invention has been described for use with a commercially available closure liner it is equally applicable with different liner constructions. It is feasible to substitute polyamide or cellulosic films for the tough film layer 40 or eliminate the layer 40 and place the heat seal layer 41 directly in contact with the foil layer. Examples of heat seal layers 41 include polyolefin, vinyl based polymeric layers, cellulose nitrate, ethylcellulose, methacrylates, or rubber polymers. An example of such a construction is a 0.5 mil sealing layer; 0.75 mil embossable foil layer; a wax coating; and a 35 mil pulpboard backing.

Detailed Description Text (16):

It is also possible to eliminate the sealing layer if the material forming the embossable layer and the bottle to which it is being sealed are compatible. As an example, a 1 mil foil, wax laminated to a backing material, may be sealed to a high density polyethylene bottle. Also, the embossable layer could be a metal vapor coated sheet, polyvinyl chloride, cellulosic material, laminated cellulosic material and polyethylene or laminated cellulosic material and metal foil.

Detailed Description Text (17):

As a further example, the tough film or polyester may act as a sealing layer. One example of this would be the sealing of a 0.5 mil polyethylene terephthalate/1.0 mil aluminum foil/wax/pulpboard laminate and a polyethylene terephthalate or polyvinyl chloride bottle.

CLAIMS:

1. A process for imparting indicia onto a closure liner for a container cap during application of the liner to the container cap having a top comprising the steps of:

inserting a container cap into the liner inserting station of a lining machine,

inserting a small amount of adhesive into the cap against the top of the cap,

moving a closure liner laminate, comprising a layer of resilient material having a wax coating which coating contacts one surface of a layer of metal foil on an opposite surface of which is adhered a sealing layer suitable for sealing the laminate to a container, into said inserting station,

cutting from said laminate a section of said laminate to fit into said cap,

inserting the cut section of said laminate into said cap,

pressing said section against the top of said cap, and

imparting an embossed image into said laminate to define an embossed image in said metal foil.